



Cancer & Environment Network of Southwestern Pennsylvania

The Cancer and Environment Network of SWPA Science Support and Advisory Workgroup recognizes the gap in accessibility with research and research terminology. Highly specialized scientific jargon should not be a barrier to accessing information, and to bridge that gap and increase equity in research, we have created a list of common research-oriented terms that communities and individuals are likely to encounter when finding environmental health articles.

Glossary of Terms

Association: A measure of the relationship between an exposure and an outcome. In journal articles such as [this article on pesticides and childhood cancer](#), the term “association” is used in the following way: “We examined *the association* between maternal and paternal exposure to pesticides and childhood cancer in a Swedish register-based case-control study.” A strong association in a well-designed study indicates that the exposure was observed to increase the risk of the disease. Multiple research studies showing associations between the same exposure and same outcome strengthen the evidence that the exposure caused the outcome.

Carcinogen: Carcinogens are chemicals or other agents, such as radiation, that cause cancer.

Causation: Causation means that there is a proven relationship that a specific exposure is a cause of the disease. For experts to state that a specific risk factor (e.g., air

pollution) is a cause of cancer (e.g., lung cancer) requires multiple lines of evidence, including timing of exposure (it occurred years before the disease was diagnosed), consistency in the results across multiple studies, assurances that no other exposure can be the reason (see confounding below), among other issues. Typically it requires expert committees to review all lines of evidence to conclude that exposure X causes cancer such as described in this [press release from the World Health Organization](#) about air pollution as a cause of cancer.

Hazard: A *hazard* is simply something that can cause harm. *Hazards* are often categorized by their type, such as physical (i.e., an object obstructing a walkway), chemical, radiation, or biological (i.e., a virus or bacteria), among others. A *hazard* is often considered acute (immediate) or chronic (not immediately apparent, may emerge only after an extended period of time). Chemicals are often classified by the

type of *hazards* they can cause, including diseases such as cancer or asthma or environmental effects. A *hazard* evaluation (also called a hazard assessment) focuses on defining what types of harmful effects could occur

Meta-analysis: This is a type of health study or analysis where researchers combine the data from smaller studies to make one very large study. A meta-analysis is also called a “pooled analysis or pooled study.” It is used to increase understanding of whether a specific risk factor (see definition below) is associated (see definition above) with a specific disease by combining the data from multiple similar studies. [This study](#) of a type of childhood brain cancer (neuroblastoma) and exposure to pesticides when their mothers were pregnant (prenatal exposure) is an example of an meta-analysis.

Prevalence: The portion of a population that have a specific characteristic or quality

Risk: The US Environmental Protection Agency explains that *risk* means the chances of a harmful effect (such as cancer) occurring to humans or the environment (such as other organisms or the climate) from exposure to a specific factor (such as a specific chemical). The US EPA calculates *cancer risk* for air and water pollutants based on the chance of cancer occurring in a million people exposed at a specific amount over their lifetime. In Allegheny county, cancer risk from air pollution is high compared to other counties across the county as described in this [CENSWPA factsheet](#). The term *risk* is also used in epidemiologic health studies (used formally as the term *relative risk*) and is the measure of an association (see defined

above) between exposure (see defined above) and disease in the study as described [in this study of kidney cancer and exposure to pesticides](#).

Risk factor: A risk factor is something that increases a person’s chance of developing disease. For example, smoking, radon and exposure to air pollution are all risk factors for developing lung cancer. Exposure to asbestos is a risk factor for the development of a cancer called mesothelioma.

Statistical Significance: *Statistical significance* tells us how certain researchers are that study results or study estimates will hold true or can not be explained by chance. For cancer rates, comparisons between groups (for example a comparison of rates between your community and the state-wide rate) are often made. Differences between groups are said to be *statistically significant* or *statistically significantly different* when chance can be ruled out as an explanation. It is conventional practice to state that the results are statistically significant if there is less than or equal to a 5% probability that chance alone can explain the difference between groups. This is called a p-value (probability value) statistic (see above). If the probability (the p-value) is less than 1%, the evidence is even stronger that the observed difference is true and not due to chance alone. Results that are not statistically significant imply that chance cannot be ruled out as the explanation for the difference between groups, but it does not mean that the results are due to chance. Particularly when the study has involved fewer people, statistical significance of greater than 5%--for example 10%--should be considered indicative of an association, rather than dismissed outright as a negative result.

Toxic: A poisonous substance that can cause adverse effects on health